CLAIMS

1.   A   method   of   controlling   access   by   mobile   users
(105a1,105a2,105a3,105b1,105b2) of a substantially infrastructureless communications
network to a shared communication medium, wherein the shared communication medium
is partitioned into a plurality of individual communication channels (CH1-CH42) that can
be individually exploited for communications between the network users, the method
comprising:

determining the existence of at least one main direction of movement (A,B) of the
network users, said main direction of movement being a direction around which
directions of movement of a number of network users are clustered;

associating a group (CH1-CH20,CH21-CH40) of communication channels within
said plurality of communication channels to the at least one main direction of movement;
and

reserving the communication channels of said group to the network users moving
substantially in said main direction of movement.

2. The method according to claim 1, comprising grouping the communication
channels into a number of groups depending on a plurality of main directions of
movement, and reserving different groups of channels to respective main directions of
movement.

3. The method according to claim 2, in which each channel group comprises a
number of channels that depends on a number of network users having directions of
movement clustered around the respective main direction of movement.

4. The method according to any one of the preceding claims, including having
each network user communicating to the other network users information (300a,300b)
concerning the respective direction of movement.

5. The method according to claim 4, in which said information concerning the
respective direction of movement comprises information on a network user's velocity
vector (V1-V5).

6. The method according to claim 5, in which said information on the network user's velocity vector are obtained exploiting a geolocation detector (230,235), particularly a GPS-based detector.

7. The method according to claim 4, comprising having each network user calculate a distribution $(f'(x))$ of movement directions of at least the neighboring network users, and determining the at least one main direction of movement by analyzing such a distribution.

8. The method according to claim 7, in which said analyzing the distribution includes determining peaks in the distribution, determining the number of network users having direction of movement clustered around each peak, and validating a peak as a main direction of movement provided that the respective number of network users exceeds a prescribed value.

9. The method according to claim 8, further comprising:

calculating average velocity vectors for each main direction of movement by averaging the velocities of network users having direction of movement clustered around that direction of movement;

calculating relative average velocities between the average velocity vectors;

validating each main direction of movement provided that the relative average velocity thereof to the other average velocity vectors is not lower than a prescribed lower limit.

10. The method according to claim 1, in which said reserving the communication channels of said group to the network users moving substantially in said main direction of movement comprises assigning the channels of the group to the different network users substantially on a random basis.

11. The method according to claim 1 or 2, further comprising reserving a group of channels of said plurality of channels to network users not having a direction of movement clustered around the at least one main direction of movement.

12. A Media Access Control (MAC) layer (220) controlling access by a mobile user of a substantially infrastructureless communications network to a shared communication medium, wherein the shared communication medium is partitioned into a plurality of individual communication channels (CH1-CH42) that can be individually exploited for communications between the network users, the MAC layer granting access to the shared communication medium by:

determining the existence of at least one main direction of movement (A,B) of the network users, said main direction of movement being a direction around which directions of movement of a prescribed number of network users are clustered;

associating a group (CH1-CH20,CH21-CH40) of communication channels within said plurality of communication channels to the at least one main direction of movement;

assigning to the network user one communication channels of said group in case the network user's direction of movement is clustered around the at least one main direction of movement.

13. The MAC layer according to claim 12, in which the MAC layer communicates to the MAC layers of the other network users information (300a,300b) concerning the direction of movement the network user.

14. The MAC layer according to claim 13, in which the MAC layer includes information on a network user's velocity vector (V1-V5) in at least one message transmitted by the network user.

15. The MAC layer according to claim 14, in which said information on the network user's velocity vector are derived from a geolocation detector (230,235), particularly a GPS-based detector.

16. The MAC layer according to claim 14, in which the MAC layer calculates a distribution ($f(x)$) of movement directions of at least the neighboring network users, and determines the at least one main direction of movement by analyzing such a distribution.

17. The MAC layer according to claim 16, in which peaks in the distribution are

determined, the number of network users having direction of movement clustered around each peak is determined, and a peak is validated as a main direction of movement provided that the respective number of network users exceeds a prescribed value.

18. The MAC layer according to claim 17, in which:

average velocity vectors for each main direction of movement are calculated by averaging the velocities of network users having direction of movement clustered around that direction of movement;

relative average velocities between the average velocity vectors are calculated;

each main direction of movement is validated provided that the relative average velocity thereof to the other average velocity vectors is not lower than a prescribed lower limit.

19 The MAC layer according to claim 12, in which said one communication channel of the group is assigned to the network user substantially on a random basis.

20. The MAC layer to claim 12, in which the network user is assigned a communication channel not belonging to said group in case the network user's direction of movement is not clustered around the at least one main direction of movement.

21. A transmitter for a mobile user of a substantially infrastructureless communications network comprising a MAC layer according to any one of claims 12 to 20.

22. A substantially infrastructureless communications network with mobile network users acting as communication traffic routers, wherein the network users have transmitters according to claim 21.